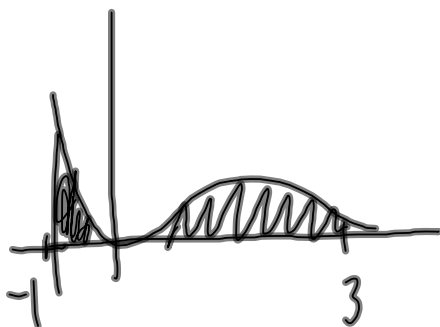


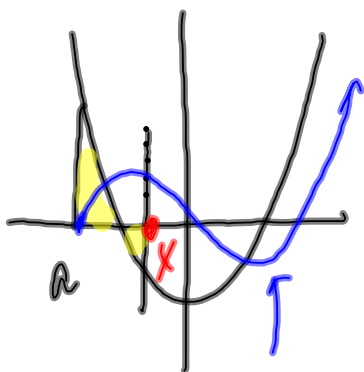
36



$$\int_{-1}^3 x^2 e^{-x} dx = 1.8719$$

Nov 17-9:00 AM

5.3 area functions, antiderivatives



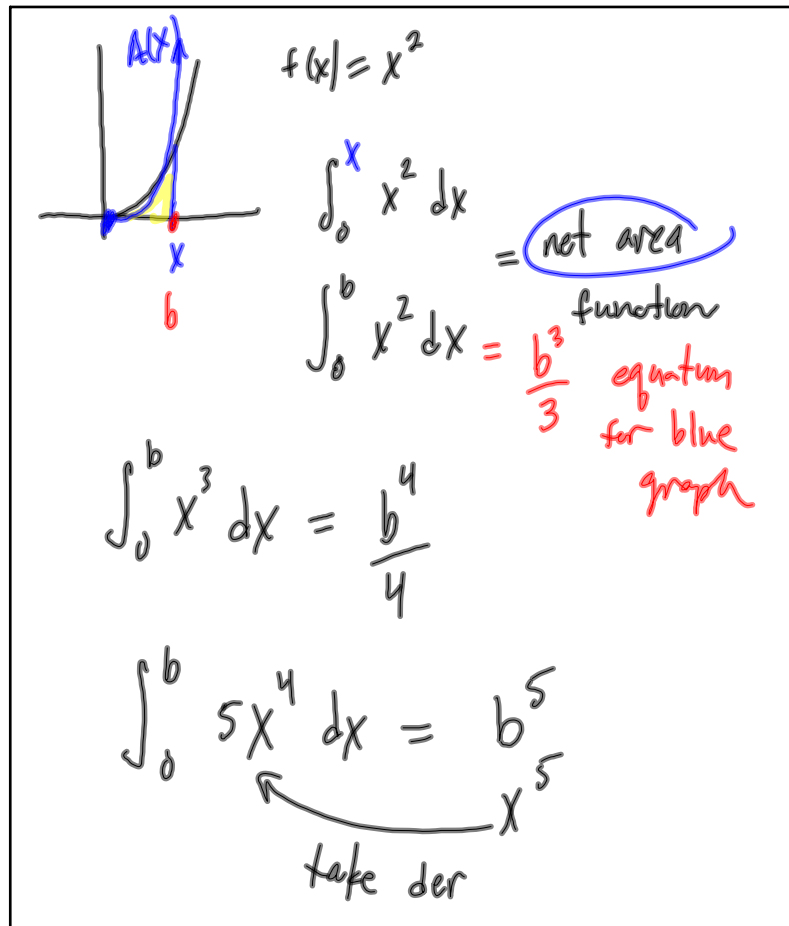
graph
of a net area
function

drag x - changes right
hand boundary

drag until ^{net} area = 0

$$\int_a^a f(x) dx = 0$$

Nov 17-9:32 AM



Nov 17-9:48 AM

find the area under $y = 5x^4$
 from $x=0$ to $x=2$

$$\int_0^b 5x^4 dx = b^5 \Big|_{b=2} = 32$$

$$\int_0^2 5x^4 dx = 32$$

Nov 17-10:01 AM

$$\int_a^b x^2 dx = \frac{b^3}{3} - \frac{a^3}{3}$$

$$\begin{aligned} \int_0^{\pi} \sin x dx &= -\cos \pi - (-\cos 0) \\ &= -(-1) + 1 = \boxed{2} \end{aligned}$$

antiderivative of $\sin x = -\cos x$

Nov 17-10:06 AM

Fundamental Theorem of Calculus

FTC

definite integral

$$\int_a^b f(x) dx = F(b) - F(a)$$

$$F'(x) = f(x)$$

or $F(x)$ is an antiderivative of $f(x)$

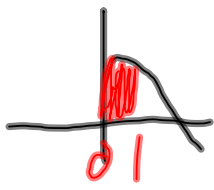
$$F(x) = \int f(x) dx$$

(indefinite integral)

Nov 17-10:12 AM

another way to write the FTC

$$\frac{d}{dx} \int_a^x f(t) dt = f(x)$$

$$\int_0^1 \frac{1}{1+x^2} dx = \tan^{-1} x \Big|_0^1$$
$$= \tan^{-1} 1 - \tan^{-1} 0$$
$$= \pi/4 - 0 = \left(\frac{\pi}{4} \right)$$


Nov 17-10:17 AM